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NOTES ON *EMBADOMONAS SINENSIS*,
FAUST AND WASSELL 1921 *

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Embadoomonas sinensis was recovered from diarrhoeic stools of Chinese patients in the Church General Hospital, Wuchang, in July, 1921, and described by Faust and Wassell under that name (1921: 543). During a month's intensive study of 57 medical cases, 9 stools were found to contain this flagellate. In all of these cases save one, vegetative or cystic stages of *Entamoeba dysenteriae* had been previously demonstrated. It has since been found in the same hospital, but as yet has not been demonstrated in other localities in China. Normal quiescent individuals are seen in Figures 1 to 4.

The living organism is extremely active. In moving forward it performs a smooth spiral glide, at which time the animal is oval-elongate, and on careful observation is found to be eugleniform (Figs. 5-7). This is obviously due to the extreme plasticity of the protoplasm, for on becoming quiescent, especially at periods of feeding, the organism assumes an obovate outline, very similar to that of the related species, *Embadoomonas intestinalis* (Wenyon and O'Connor). At times, however, quiescent forms (Figs. 8-10) become elongate and attenuate, particularly in the posterior half of the body, but on stimulation they resume once more the normal obovate form. The species under consideration tends, therefore, to assume a characteristic shape and form, although the protoplasm lends itself readily to change under the proper conditions. In motile forms the body has an average measurement of 14μ in length by 4.2μ in transverse diameter. Quiescent forms have a mean average of 10μ in length by 7μ in width. Attenuated individuals may reach a body length of 20μ . Certain strains are much larger than others. On the whole, it seems probable that the average measurements of this species are considerably larger than those of *Embadoomonas intestinalis*.

In general, the specific characters of *E. sinensis* agree with those of *E. intestinalis*, although differences are apparent. In the first place, there is not the marked differentiation between anterior and posterior flagella, which probably accounts for the smoother movement of the Chinese species. These flagella are, however, definitely specialized in

* Contribution from the Parasitology Laboratory, Department of Pathology, Peking Union Medical College.

direction and probably in function, although as far as I have observed their movements are synchronized. They stain readily with Donaldson's eosiniodide preparation. In the quiescent organism the cytostome is wide and pouch-like; in the attenuate individual it is an elongate gullet, which may at times become slightly spiralled to conform to the body form. There is a blepharoplast at the base of each of the flagella. These blepharoplasts lie an appreciable distance from the nucleus. I have not been able to demonstrate a neuromotor connection with the latter organ. The nucleus is somewhat smaller than that of *E. intestinalis*. Excretory vacuoles are common but the general consistency of the protoplasm is smooth and homogeneous. The polar view of the organism at rest is round (Fig. 12).

The organism divides by longitudinal fission, with separation of the daughter elements at the posterior end, even while the anterior organelles are still in the process of division. After separation the daughter cells are at first pyriform, but soon become actively motile and assume an elongate shape.

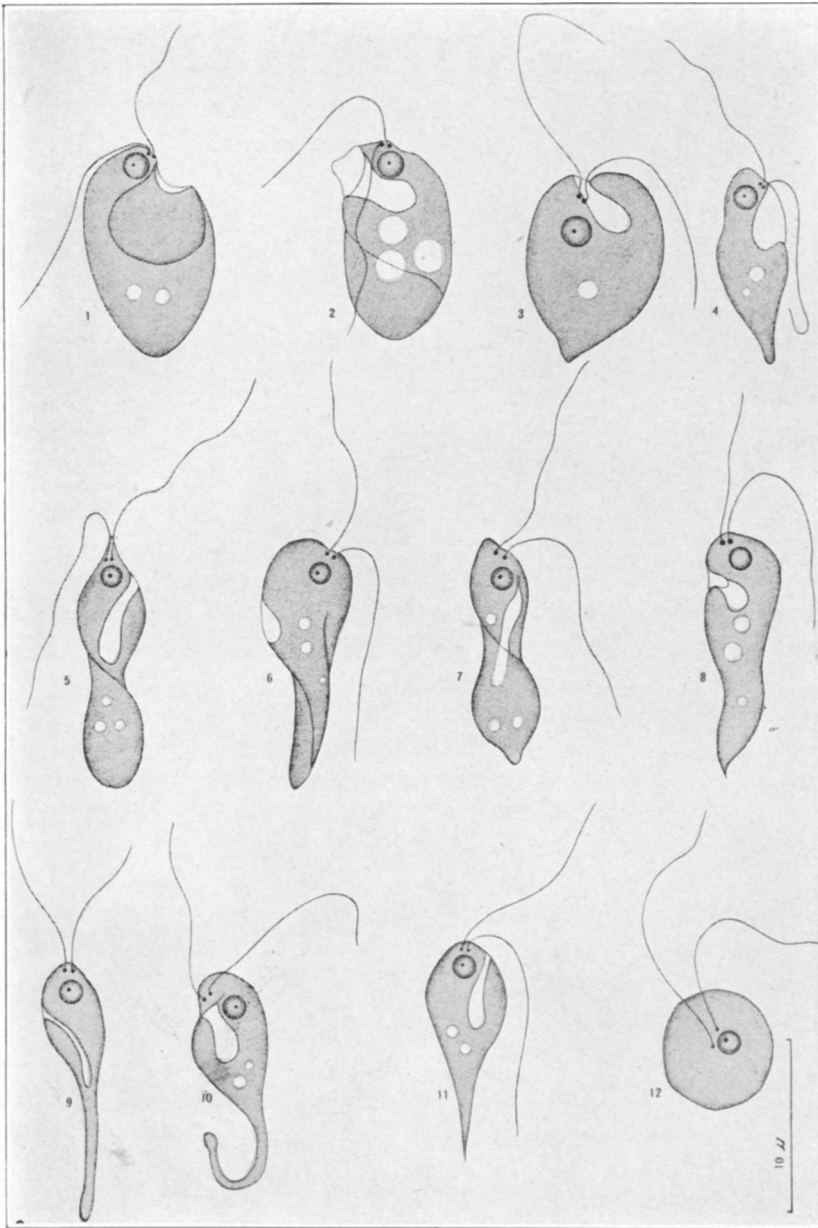
Small ovate-elongate cysts, which were found in the same stools, apparently belong to this species. They measure 3 by 6μ and are most abundant after the vegetative forms have disappeared from the stools.

Embadomonas intestinalis has been found in Alexandria, Egypt, and in overseas and home-service troops of the United States in New York, as well as in natives in the United States who have no contact with imported cases. *E. sinensis* has been found only in native Chinese at Wuchang. In both instances the infections are from diarrhoeic stools or those containing *Entamoeba dysenteriae* or *Trichomonas hominis*. In amoebic dysentery they appear several days after the critical period and are found to grow more rapidly at room temperature (30 C.) than at body heat. However, I have noted particularly that they have been derived from the stool and not as a contamination from bed-pan or specimen box. It seems more than likely, therefore, that the organism is not itself primarily a parasite, although large numbers of the species in the stool may give rise to diarrhoea. Nevertheless, it is significant that the species occurs in patients suffering from amoebic dysentery. It seems safe to assert, then, that it fits into the environment and same organic cycle as *Entamoeba dysenteriae*. Even in questionable cases where *Ent. dysenteriae* has not been demonstrated in the stool, the presence of Embadomonads may be indicative of amoebic infection.

REFERENCE CITED

- Faust, E. C., and Wassell, C. McA. 1921.—Preliminary Survey of the Intestinal Parasites of Man in the Central Yangtze Valley. China Med. Jour., 35: 532-561.

FAUST—EMBADOMONAS SINENSIS



EXPLANATION OF PLATE VI

- Figs. 1-4.—*Embadomonas sinensis*, quiescent forms.
Figs. 5-7.—Actively motile individuals.
Figs. 8-11.—Elongate individuals.
Fig. 12.—Polar view of quiescent individual.